Remarks

Claims 1, 3-20, 22, and 27-32 were previously presented.

Claims 1, 11, 17, 18, 22, 27, 29, and 32 are currently amended without introducing new matter. Support for the amendments can be found throughout the specification, claims, and drawings as originally filed.

No new claims are added.

Claims 1, 3-20, 22, and 27-32 remain pending for examination, with claims 1, 11, 17, and 22 being in independent form.

Rejections under 35 U.S.C. § 103

Claims 1, 3, 8-12, 17-18, 27, and 29 were rejected under 35 U.S.C. § 103(a) as would have been obvious over the teaching of Hark in U.S. Patent No. 4,808,287 (hereinafter referred to as "Hark") in view of the teachings of Batchelder et al. in U.S. Patent 6,126,805 (hereinafter referred to as "Batchelder"), Sato et al. in U.S. Patent No. 6,733,646 (hereinafter referred to as "Sato"), and Zhang in U.S. Patent No. 6,780,328 B1 (hereinafter referred to as "Zhang").[1]

Applicants disagree that the respective subject matter of each of claims 1, 3, 8-12, 17-18, 27, and 29 would have been obvious over Hark in view of Batchelder, Sato, and Zhang because none of the cited references discloses a method of producing treated water comprising introducing a first portion of water to be treated from a point of entry into a storage vessel while introducing a second portion of the water to be treated into an

[1] On page 6 of the Office Action, the examiner further relies on the teaching of Rela which is assumed to be U.S. Patent No. 6,607,668 B2 (hereinafter referred to as "Rela").

electrochemical device; or a method of producing treated water comprising storing a first portion of water to be treated from a point of entry in a vessel, and introducing a second portion of the water to be treated the point of entry into an electrodeionization device; or a water treatment system comprising a water storage vessel fluidly connected to a point of entry, and an electrochemical device fluidly connected to the point of entry and to the water storage vessel.

The examiner asserts that Zhang teaches "combining active carbon filters, reverse osmosis membranes and EDI units as plural units in common plural 'stages' constructed for operation in series and/or parallel" and that Zhang teaches combining "plural units into a common stack or vessel" and "extends residence time in the treatment vessels (up to 100 minutes) sufficiently to constitute storage." The examiner thus concludes that it would have been obvious to "have treated and stored the water in common vessels or as sequential units arranged in series as zones in a common vessel" to achieve a more compact system occupying less space, and to extend exposure time of the water to the treatment elements to more completely purify it.

Zhang discloses fluid purification systems and methods employing deionization followed by ionization followed by deionization. (Zhang at Abstract, at column 3, lines 2-9, and at column 5, lines 9-18.) In FIG. 2, which is reproduced below, Zhang shows the two-stage deionization system including an ionization or conversion stage.

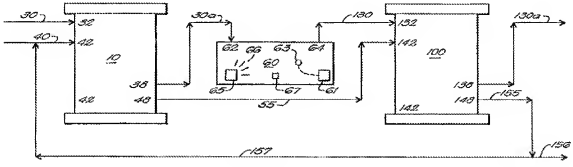

FIG. 2

In Zhang's disclosed system, feed stream 30 flows into a first electrodeionization (EDI) unit 10 and out as deionized product stream 30a, which then flows into ionizing unit 60. (Zhang at column 6, lines 62-67.) Bond-breaking agents are utilized in ionizing unit 60 to ionize organic species in product stream 30a. (Zhang at column 7, lines 1-3.) Exposure to the bond-breaking agent occurs for a predetermined period of from one second to 100 minutes. (Zhang at column 7, line 66-column 8, line 1.) After exposure to the bond-breaking agent, product stream 130 exits ionizing unit 60 flows into a second EDI unit 100 wherein organic compounds which have been oxidized to ionized or ionizable compounds by ionizing unit 60 are removed in the diluting stream of second EDI unit 100. (Zhang at column 8, lines 9-15.) The second product stream 130a from second EDI unit 100 is substantially free of organic carbon species. (Zhang at column 8, lines 15-17.) The product stream can be recycled back to EDI unit 10 and into feed stream 30 by way of loop 159.[2] (Zhang at column 8, lines 17-19.) A concentrate stream effluent from the first EDI unit 10 may flow as the concentrate stream into the second EDI unit 100. (Zhang at column 8, lines 20-28.) A portion of the concentrate effluent 155 from the second EDI unit 155 may be discarded as blowdown stream 156 and the remainder recycled with concentrate influent 40 by way of loop 157. (Zhang at column 8, lines 28-32.)

Zhang notes that both EDI units 10 and 100 may reside in the same EDI stack, between the same pair of electrodes. (Zhang at column 8, lines 33-38.) Thus, one configuration of Zhang's system involves a single stack with the first EDI unit 10 integrated with the second EDI unit 100. In an exemplary configuration, Zhang describes utilizing a coupler that serially connects together the two sub-stacks, the first EDI unit 10 and the second EDI unit 100. (Zhang at column 8, lines 39-46.) The coupler can provide the bond-breaking agent. (Zhang at column 8, line 47.) Notably, Zhang emphasizes that the bond-breaking agent (in ionizing unit 60) is downstream from the first EDI unit 10 and upstream of the second EDI unit 100. (See Zhang at FIG. 2 and at column 5, lines 9-21.) Indeed, Zhang requires that unit 60 must be downstream from first EDI unit 10 and upstream of the second

[2] In FIG. 2, loop 159 from the treated product outlet 138 of unit 100 to the inlet of unit 10 is not illustrated.

EDI unit 100 because the bond-breaking agent must ionize or render ionizable the organic compounds in the stream from the first EDI unit 10 prior to transfer to the second EDI unit 100. (See also Zhang at column 8, lines 9-16.) Thus, Zhang requires that the water exposed to the bond-breaking agent must be downstream from the first EDI unit, and it must be upstream of the second EDI unit. Therefore, in Zhang, the water retained, or "stored" as mischaracterized by the examiner, is downstream from, or upstream to an electrodeionization device, but not parallel therewith. Zhang thus does not teach a method of producing treated water comprising introducing a first portion of water to be treated from a point of entry into a vessel while introducing a second portion of the water to be treated from the point of entry into an electrochemical device.

Zhang does not mention storing the water to be treated from a point of entry in a vessel. Indeed the term "vessel" is not mentioned in Zhang. Instead, the examiner distorts Zhang's description directed to exposure time as constituting storage in a vessel because the examiner presumes exposure for 100 minutes can be considered as storing. The characterization misinterprets Zhang because Zhang does not indicate exposure time as being equivalent to storing. Further, no explanation has been presented as to how or why one skilled in the art would consider exposure time to be the same as storing water in a vessel. Rather, one skilled in the art, reading Zhang as whole, would understand that the exposed water should not be stored and, instead, be immediately delivered upon exposure to the bond-breaking agent to the second EDI unit 100 to increase the likelihood of promoting electrokinetic transport of the ionized species before such species reverts to its non-ioinized state.

Thus the examiner misinterprets Zhang to find that Zhang satisfies the claimed subject matter. In essence, rather than construing the claims broadly as reasonably permissible and then comparing the interpreted claims to what the reference teaches, shows, or suggests, the examiner, instead, misinterprets Zhang broadly, without regard to the context of the description, to distort its description so as to read on the claimed subject matter. (Ex parte Racenet, Appeal 2009-005228 Board of Patent Appeals and Interferences December 16, 2009.)

Zhang also does not teach a method of producing treated water comprising storing a first portion of water to be treated from a point of entry in a vessel, and introducing a second portion of the water to be treated into an electrodeionization device, and further introducing a portion of the water from the vessel into the electrodeionization device.

None of the cited references teaches or suggests the above-noted recited features. Therefore, the prima facie case of obviousness based on Hark, in view of Batchelder, Sato, and Zhang as to each of claims 1, 3, 8-12, 17-18, 27, and 29 is improper.

None of the cited references teaches a water treatment system comprising a water storage vessel fluidly connected to a point of entry, the water storage vessel have a plurality of zones with differing water quality levels, and an electrochemical device fluidly connected to the point of entry and the water vessel.

Instead, the examiner distorts Zhang's disclosure as both teaching a vessel and an electrochemical device. The examiner alleges that each of the Zhang stages represents the plurality of zones which collectively constitute a "vessel." However, Zhang states that the disclosed system is a two stage deionization system with the first EDI unit and the second EDI unit. (Zhang at column 5, line 66- column 6, line 9.) Thus, as characterized by the examiner, the electrochemical device serves as both a zone in the vessel and an electrochemical device fluidly connected to the point of entry and the water storage vessel. The examiner's analysis is based on an illogical distortion of Zhang because it requires a recited element to be a subcomponent of itself. As noted above, because the examiner has also characterized the coupler or the ionizing unit as the vessel, there is no showing that the coupler comprises a plurality of zones. Therefore, the prima facie case of obviousness is improper.

The examiner alleges that Sato teaches that water treated by systems encompassing reverse osmosis and electrochemical devices "is equally well used for the industries specified by Rela as well as household use (column 1, lines 10-29 and column 7, lines 15-50)" and

"[i]t would have been obvious to the skilled water treatment artisan to have utilized the treatment system of Rela for distribution to households, since there is a similar need for ultrapure water free of the varied contaminants the water treatment system entails." That is, because Sato mentions that deionized water, regardless of its level of purity, is used in the household setting, the examiner asserts it would have been obvious to utilize any deionization system, including the ultra pure water system disclosed by Rela in a household setting. (At column 1, lines 5-6, Rela notes that the disclosed invention "relates to a water purifier which delivers a high quality, pure stream of water.) Like Rela and Sato, Hark teaches producing ultra-pure water. (Hark at Abstract and at column 1, lines 5-30.)

The examiner's allegation that Sato discloses utilizing ultra pure water in a household is mischaracterized. Sato fails to clarify how Rela's system can be particularly used in a household. Sato, at column 1, lines 10-29, states that:

> Deionized water is used for various purposes, for example, in plants such as for semiconductor production and liquid crystal display production, in industrial facilities such as for pharmaceutical industry, food industry, and electric power industry, even in households, and in laboratories. Electrodeionization apparatuses are frequently used to produce deionized water as described in Japanese Patent No. 1782943, Japanese Patent No. 2751090, and Japanese Patent No. 2699256. A conventional electrodeionization apparatus of FIG. 2 includes electrodes which consist of an anode 11' and a cathode 12', anion-exchange membranes 13 and cation-exchange membranes 14'. The membranes are alternately arranged in such a manner as to alternately form concentrating compartments 15' and desalting compartments 16' between the anode and the cathode. The desalting compartments 16' are filled with anion-exchanger and cation-exchanger made of ion exchange resin, ion exchange fibers, or graft exchanger. In the desalting compartments 16', the anion-exchanger and cation-exchanger are in the mixed state or multiple-layered state.

Sato does not teach or suggest utilizing ultra pure water in a household. At best, one skilled in the art, reading Sato's disclosure would have recognized that water softening, such

as by ion exchange, has been utilized in a household. Nonetheless, and without explanation, the examiner distorts Sato's disclosure to teach that one skilled in the art would have used ultra pure water in a household setting. Notably, Sato, at column 2, lines 17-21, explicitly clarifies that:

> It is an object of the present invention to provide an electrodeionization apparatus which removes silica and boron at extremely high ratio, a method of operating the same, and a system employing the electrodeionization apparatus for producing ultra pure water.

Thus, Sato's disclosure is not concerned with water for household use.

Significantly, water for household use has different properties than ultra pure water used in applications such as in the pharmaceutical and semiconductor device fabricating industries. Ultra pure water is corrosive and as such, one skilled in the art would not have utilized ultra pure water in a household. (See U.S. Patent No. 5,647,727, clarifying at column 2, lines 64 et seq., that high purity water, such as ultra pure water, is very corrosive and would aggressively and unremittingly corrode unprotected surfaces.) Indeed, because ultra pure water is highly corrosive, one skilled in the art would have been discouraged from its use in a household because utilizing ultra pure water in a household would damage household appliances as well as the household water distribution system. Thus, one skilled in the art would not have combined any of the teachings of the cited references for use in a household setting.

Moreover, none of these cited references teaches a household distribution system as recited in dependent claim 18. Instead, the examiner conclusorily asserts that because Sato suggests that treated water can be used in a household, such water must necessarily be introduced into some sort of distribution system and household point of use appliance. No explanation, however, has been presented why one skilled in the art would have utilized the household distribution system. Instead, one skilled in the art would have recognized that each of the plurality of points of use in a household would have required differing levels of

water purity, and would not have necessarily utilized the household distribution system because it would undesirably deliver treated water to a point of use that would not need treated water.

Therefore, any alleged prima facie case of obviousness presented by the examiner is defective because there has been no particular showing or explanation as to how any of the other cited references, teaches, shows, or suggests each and every limitation as particularly recited in claims 1, 3, 8-12, 17-18, 27, and 29.

Accordingly, reconsideration and withdrawal of the rejection of claims 1, 3, 8-12, 17-18, 27, and 29 as would have been obvious over Hark in view of Batchelder, Sato, and Zhang under 35 U.S.C. § 103(a) is respectfully requested.

Claims 4-7, 13-16, 19-20, 28, and 30-31 were rejected under 35 U.S.C. § 103(a) as would have been obvious over the teaching of Hark in view of the teachings of Batchelder, Sato, and Zhang, and further in view of the teaching of Rela in U.S. Patent No. 6,607,668 B2 (hereinafter referred to as "Rela").

Each of claims 4-7, 13-16, 19-20, 28, and 30-31 respectively depends from independent claims 1, 11, and 17. As noted above, none of the cited references teaches or suggests the subject matter in the manner respectively recited in each of independent claims 1, 11, and 17. Rela fails to cure the above-noted deficiencies of these cited references. Thus, the respective subject of each of these claims would not have been obvious over Hark in view of Batchelder, Sato, Zhang, and further in view of Rela.

Further, the examiner misreads Rela as disclosing treated and recycled water mixed with water from the point of entry, as between activated carbon filter 2 and carbon filter 3. Rela does not mix treated water with water to be treated from the point of entry. When properly read, Rela teaches recycling concentrated wastewater (RO concentrate) through a conduit 50. (Rela at column 9, lines 16-17 and at lines 23-25.)

Therefore the alleged prima facie case of obviousness as to claims 4-7, 13-16, 19-20, 28, and 30-31 is improper for failing to teach or suggest each and every limitation in the particular manner recited.

Accordingly, reconsideration and withdrawal of the rejection of claims 4-7, 13-16, 19-20, 28, and 30-31 as would have been obvious over Hark in view of Batchelder, Sato, Zhang, and Rela under 35 U.S.C. § 103(a) is respectfully requested.

Claim 22 was rejected under 35 U.S.C. § 103 (a) as would have been obvious over Hark in view of Batchelder, Sato, and Zhang, and additionally in view of the teaching of Andrews et al. in U.S. Patent No. 6,458,257 B1 (hereinafter referred to as "Andrews").

The subject matter of claim 22 would not have been obvious over Hark in view of Batchelder, Sato, and Zhang and further in view of Andrews because none of the cited references teaches or suggests a method of facilitating water treatment comprising fluidly connecting a pressurizable water storage vessel downstream from a point of entry and upstream of a household distribution system, and fluidly connecting an electrochemical device downstream from and upstream of the pressurizable water storage vessel.

Andrews does not teach or suggest these recited features. Instead, Andrews discloses a serial arrangement with an ozone generator 155 and water delivery or distribution system with a water reservoir system 160.

Because there is no teaching or suggestion for fluidly connecting the electrochemical device upstream of and downstream from a vessel in these cited references, the prima facie case of obviousness is improper.

Accordingly, reconsideration and withdrawal of the rejection of claim 22 as would have been obvious over Hark in view of Batchelder, Sato, Zhang, and additionally in view of Andrews under 35 U.S.C. § 103(a) is respectfully requested.

Claim 32 was rejected under 35 U.S.C. § 103 (a) as would have been obvious over Hark in view of Batchelder, Sato, and Zhang, and additionally in view of Andrews, and further in view of Rela.

Claim 32 depends from independent claim 22. As noted above, none of Hark, Batchelder, Sato, Zhang, and Andrews teaches or suggests a method of facilitating water treatment in the manner claimed because these cited references do not teach or suggest fluidly connecting an electrochemical device upstream of and downstream from a pressurizable vessel. Rela also does not teach or suggest this feature of the invention. Thus, the prima facie case of obviousness is improper.

Accordingly, reconsideration and withdrawal of the rejection of claim 32 as would have been obvious over Hark in view of Batchelder, Sato, Zhang, and additionally in view of Andrews and Rela under 35 U.S.C. § 103(a) is respectfully requested.

Conclusion

In view of the foregoing Amendments and Remarks, this application is in condition for allowance; a notice to this effect is respectfully requested. If the examiner believes that the application is not in condition for allowance, the examiner is requested to call Applicants' attorney at the telephone number listed below.

If this Response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicants hereby request any necessary extension of time for entry and consideration of this paper and any other paper. If there is a fee occasioned by this Response, including an extension fee that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 50/2762 (ref. no. I0168-708019).

Respectfully submitted,
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